DATA PROCESSING DIGEST

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Applications

STEPS IN ACHIEVING CONTROL OF MATERIAL ON AN ELECTRIC COMPUTER

H. Warren White, Lockheed Aircraft Corp., Burbank, California
N.A.A. BULLETIN, June 1959; pages 51-60

Lockheed Aircraft has developed a system of material control in which an IBM 705 is used to produce action documents pointing out specific inventory items which need attention. A basic requirement for such a system is the input. The elements of the input in material control are:

1. The material requirements, i.e., the breakdown of types and quantities of materials and parts necessary to build each end-product. Requirements for purchased parts are read into the system directly. Requirements for manufactured parts are matched against raw material conversion files and used for summarizing raw material needs. These requirements come from punched cards prepared from blueprint information which gives serial number, effectivity, model, customer, and assembly.

2. Number of end products to be produced. This information is derived from a sales order or sales forecast, and results in a work order which is used throughout the system as the summary control for all information.

3. Transactions to date. This gives the current status of each item in inventory, and includes orders, receipts, disbursements, as a by-product of the ledger posting operation (described later).

4. Manufacturing planning position which describes how, in what sequence, and where the end-product will be built. This vital element of input is most frequently overlooked. Without it, all material must be ordered to the earliest need, or some material must be delivered later on the assumption it will not be immediately required. "This

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is a risky business and frequently results in both an overly inflated inventory and in an undue number of shortages."

5. Manufacturing schedule, indicating the point in time when each item of manufacture will pass through the various stages called for in the manufacturing plan. This is the basis for sequencing all work, including purchase orders for materials and parts bought outside the company.

6. A multiple element including the various policies on inventory level, financial limitations, procurement time, vendor history, previous buys, etc.

Five steps to any input system

The action performed on the input is in five steps, applicable to any system, whether manual, mechanical, or electronic:

1. Extension of requirements.

2. Summary of orders, receipts, and disbursements.

3. Calculation of order quantities or surplus.

4. Schedule of need.

5. Application of procurement controls.

All of these transactions are preliminary to the primary function--the generation of action documents or reports. These reports are:

1. Distribution of material charges to the various ledgers.

2. Purchase order.

3. Declaration of surplus material.

4. Reports and material studies for evaluation of the inventory status.

Ledger posting begins cycle

The cycle of document flow in the Lockheed system begins with the order, receipt, and disbursing documents which are posted to the related ledgers at the bookkeeping machines, even though the source of these documents may have been the data processing center. The ledger provides an accessible record for random interrogation, and a control over the accuracy of input data. It also generates totals for auditing the computer output.

The punched-card by-product of the posting operation is used for material cost distribution and as a source for accounting reports. It serves as the input to the computer for the extraction and analysis of data on orders, receipts and disbursements.

Analysis of material status

The major product of the data processing center is the analytic report of each item of material. This report summarizes all requirements of material for a given time by contract; it gives the quantity ordered, breakdown of disbursements, quantity to be ordered. The lower portion of the report gives a recap of the open purchase orders, rejections, and open shop orders. This report is used in determining which items in inventory need individual attention. Since the magnetic tape information which produces this report includes the inventory value for each transaction, periodic extractions and summarizations may be made showing monetary balances by contract, broken down to dollars on hand, on order, and to be ordered. This is of value in determining the financial status by contract.

Special reports produced from this same tape file reflect discrepancies between the quantities calculated to be required on a given contract with the quantity actually disbursed. Such items may then be investigated and corrective action taken. Items below the limits are balanced automatically by the computer.

Major cost savings have been found through the automatic generation of action documents and by the consolidation of multiple files carrying common information on magnetic tape.

SP'S NEW EUGENE YARD GETS CAR WEIGHT FASTER

MODERN RAILROADS, April 1959; pages 64, 65

The Southern Pacific Railroad has automated its weighing procedure at its Eugene, Oregon freight yard. The system consists of an IBM APR 9600 and a Fairbanks-Morse scale, which automatically computes the weight of freight cars, and produces the information in printed form and in teletype tape for transmission. About 600 cars are weighed each day at Eugene, most of them carrying lumber. The weight information is essential to the entire lumber producer-broker-dealer-user chain.

Waybill data plus weight data produce scale ticket and punched tape

Data on waybills is punched on IBM cards in the yard office and sent to the weighmaster. As cars are to be weighed, information from the cards is entered into the system through a card reader. Load limit, tare weight, amount of snow on car and number of side stakes on flatcars are all punched into a keyboard by the weighmaster as cars pass in front of him at the scale. The card reader and the keyboard are linked to the APR console, in which are recorded the date, weather conditions, and weighmaster's code. As an IBM card is inserted into the reader, the machine types information gleaned from the card, the keyboard, and the fixed information in the APR onto printed scale tickets; simultaneously this same information is punched on teletype tape.

"CAR-FAX" BRINGS A NEW ERA IN RAILROADING

MANAGEMENT AND BUSINESS AUTOMATION, May 1959; pages 19-23.

C & NW STEPS UP TO DATA PROCESSING

MODERN RAILROADS, June 1959; pages 96-106

The Chicago and North Western Railroad has installed a gigantic IBM Transceiver network between Chicago headquarters and each of its 68 field stations to funnel freight movement information into the nerve center and back to the appropriate station. By-product information is used for accounting and management functions.

Fast routing of waybill information and tracing reports

The source document is the freight waybill which accompanies each freight car on its route. The necessary information from the waybill is keypunched into cards at the originating station. The information on the cards (a group of these cards for an entire freight train is called a "consist") is then transmitted by the station's transceiver to Chicago, where the information is sorted out and re-transmitted to those stations concerned. This process takes less than half an hour. The receiving stations can then make advance switching arrangements for the cars it will be receiving hours later, cutting down on terminal delay.

All departure, arrival, and interchange records received at the Chicago center are listed hourly and sent to the Chicago traffic department's car-tracing headquarters. Each night a complete tracing report is prepared in numerical order for fast tracing or reconsigning of carloads en route. A similar but less detailed report is airmailed to the road's 60 traffic agents.

Other reports are prepared for the road's salesmen to help them keep track of their customers' shipments. In addition, the system produces information on the location of empty equipment which is available for reloading. This has the effect of increasing the C&NW's freight car fleet at a time when the railroad industry is critically short of cars. Another and one of the most important reports is a daily "unearned" revenue report which will eventually be used in providing management with daily unearned revenue estimates and statistical reports. Other benefits include factual data for determining rate adjustments, and immediate picture of traffic trends.

Customers benefit, too. For example, a lumber broker got reports on day-to-day movement of a shipment from a C & NW agent so that he could sell the lumber en-route.

THREE-WAY TAPE EXCHANGE CUTS PAPERWORK

MANAGEMENT AND BUSINESS AUTOMATION, May 1959; pages 30, 31.

The Illinois Central, Southern, and Union Pacific railroads effected interline settlements for March in an amount exceeding $4-1/2 million, by exchanging magnetic tapes from their IBM 705

systems. Interline settlement is the standard means of resolving the interchange of freight among the nearly 700 railroads in the U. S. The terminating carrier collects the freight charges for a shipment which may have been handled by as many as 14 roads. This final carrier then must distribute portions of the freight revenue to each of the roads involved, based upon percentages agreed on and dependent upon the nature of the freight.

The new method of interline settlement is made possible by the compatible equipment of the three roads, and allows them to eliminate many intermediate steps and reduce the control and balancing efforts. ((See DPD, May 1959, page 10; "Interline Freight Account Settlement by Tape."))

THE COMPUTER AS A CRYSTAL BALL

AUTOMATIC CONTROL, June 1959; page 56

R & D efforts may now be evaluated by the use of PERT, Program Evaluation and Review Technique, a program which evaluates complex interdependence of the intellectual activities which represent expected progress in research and development projects. The program is presently under operation by the NORC at Naval Ordnance Proving Grounds on the POLARIS project. The significance of each benchmark of progress, or failure to achieve progress is the output of the computer program. The analyses provided by PERT may be tailored to the appropriate levels of management and technical interests. What makes the program remarkable is that it works with "the probabilities of technological breakthroughs to points far beyond the state of the art."

Although the real success of PERT will not be known until the results of the POLARIS Program can be compared with the computer's predictions, the system is nevertheless a "pioneering effort in applying scientific research to program evaluation."

MAGNETIC TAPE PAYS A.T.&T. DIVIDENDS

MANAGEMENT AND BUSINESS AUTOMATION, May 1959; pages 14-17, 32-35.

The American Telephone and Telegraph Co. has placed its transfer of stock and bond division records on magnetic tape for processing on its IBM 705 computer. Accuracy and promptness in handling transactions as well as the handling of large volume activities such as the recent stock split were reasons for installing the system.

A pilot operation of 17,000 accounts was tested during the time the computer site was being prepared. The model operation provided the opportunity of studying employee learning curves, and resulted in many major changes in the conversion procedures.

Automatically printed checks or proxies are scanned, then punched

Records of the 1,600,000 stockholders are processed alphabetically and according to a 10-digit account number consisting of a three-digit balancing unit, a six-digit sequence number, and a check digit. The account number is also the draft, warrant, and proxy number. A 500-number interval was left between account numbers to allow for expansion. The shareholder list is divided into balancing units of 2000 accounts each. Files are updated every six weeks, and new editions of the stock record book are prepared four times a year. These are used in the shareholders' control room where transactions originate.

Output information is printed by high-speed printers on a special continuous-form heat transfer paper which is then processed through an Addressograph-Multigraph machine which transfers the printed information onto tab cards which are checks, warrants, or proxies. The tab card documents then move through a scanning machine especially designed for this application by Intelligent Machine Research Corp. (recently purchased by Farrington Manufacturing Co.), which reads selected printed information from the card and punches it into the cards.

The system at present works on a one-shift, five-day week, but the total capacity of the system has been designed for more than twice present capacity with the addition of more output devices. Large savings have resulted from the elimination of temporary help during rush periods (as much as 65% of the total hours in this division in 1958).

305 RAMAC AT THE FRANK W. KERR COMPANY

COMPUTING NEWS, May 15, 1959; pages 13-19.

The Frank W. Kerr Company is a Detroit wholesale drug firm with 75 employees, and carrying about 16,000 items. Sales volume is between 4 and 5 million dollars a year. The company processes from 550 to 750 invoices a day, averaging just under ten items each. The RAMAC processes the order-invoice and receiving-shipping operations, updating salesmen, inventory, and customer records, printing the complete invoice, and signalling on the electric typewriter when an item goes out of stock, goes below stock level, or is not in stock.

As merchandise is received, the invoice is sent to the Purchasing Department which matches the invoice with a card produced as a result of the original purchase order. These cards are used to update the inventory balance in RAMAC. A receipts register is prepared by the typewriter.

Accounts receivable cards are used to produce driver's run reports, as well as a daily listing of sales and receipts. A summary of these reports is made weekly.

General Information

PREPARING FOR AUTOMATION

Edward T. Shipley, Wachovia Bank and Trust Co., Winston-Salem, N.C.
U.S. INVESTOR, May 2, 1959; pages 46, 47, 55-57.
BANKING, May 1959; pages 48, 113

Banks are advised to begin at once to evaluate their systems in terms of the present and immediate future electronic systems. They should know their costs and measure the efficiency of their present operation. With this data they can determine the increased productivity per dollar investment which they hope to achieve and forecast the length of time needed to recover their initial investment. They may then follow either of two courses: select equipment which has proved its abilities in banking, or budget additional funds for experimental costs.

Factors in selecting account numbering system

One of the most significant factors in changing to an electronic or semi-electronic system is the selection and installation of an account numbering system. The system should be selected in the light of its effect on the bank itself, rather than the benefits of the system on banking as a whole. Here are the factors which affect the selection of the numbering system:

1. Selection of equipment. For the semi-automatic 'tronic machines, alpha numeric systems appear to have some advantages.

2. Adaptation of the system to potential growth.

3. Number of digits involved. This has a bearing on the time involved in sorting documents on automatic sorters.

4. Ease of assigning numbers to new accounts. A straight numeric system is easier.

5. Ease of reference to basic records and files. The alpha-numeric systems seems to have the advantage here.

Banks should not rely on their customers to number each item properly. This means that banks should pre-print checks and deposit slips with customers' account numbers. They should also realize that some customers will resist paying for personalized checks, and should be prepared to handle this problem in public relations.

"For banks that can afford fairly sophisticated systems it's possible to take into account the value of additional benefits. Through computer storage facilities you can develop figures on deposit trends

and classifications. Also, loan records may yield valuable information not heretofore available because you didn't have enough manpower to produce it.... These additional benefits have a value and the cost of the equipment should be based on recognizable economies and the additional benefits should be regarded as extras over and above the savings forecast."

MAGNETIC INK CHARACTER RECOGNITION IN YOUR BANK

William Morton, Thriftimatic Corp., New York
U.S. INVESTOR, May 2, 1959; pages 35, 36.

"Banks that have delayed a planned program to take advantage of Magnetic Ink Character Recognition development, are now faced with a crash program of account numbering and check design in order to take early advantages of this new media." The various types of checking accounts will need individual planning for the new MICR system.

Problems in providing pre-printed checks for bank customers

Special Checking Accounts "will cause the least amount of trouble to the majority of banks, since they are for the most part now being personalized, and it will be possible to MICR without too much trouble.... Banks [should]weigh the advantages and disadvantages of the two commonly accepted plans: pre-sale of the book, and the pay-as-used plans. The sale-of-the-book plan has definite advantages in any MICR program," since studies show higher check usage under this plan than under the pay-as-used plan. Banks which imprint special accounts on their own premises will have to keep a close watch on quality control, since the MICR specifications are very rigid.

Regular or personal checking accounts, which are the most active accounts, will create the biggest problems for banks and check printers. There are several alternatives in prequalifying checks and deposit slips for these accounts.

1. Charge the customer for personalized checks and deposit tickets. Competition may make this unfeasible.

2. Encourage the customer to buy personalized checks. Some will not, and the bank will have to furnish MICR checks.

Commercial and business accounts usually use checks imprinted to their order by commercial lithographers, and they can be easily converted to MICR. The problem will be in getting these customers to accept ABA standards for placement of the magnetic ink characters. Another problem is that many of these customers have large quantities of checks on hand.

A possible aid to banks in this situation would be the establishment of area imprinting stations which could service banks with quality controlled MICR checks and deposit tickets with a minimum of delay in delivery and reduction in postage costs. These stations could offer 24-hour delivery and eliminate the need for customers to keep large quantities of checks on hand.

SHOULD I HAVE COMPUTER?

John R. DeHart, Adair Company, Detroit, Michigan
U.S. INVESTOR, May 2, 1959; pages 43, 44.

A complete conversion to electronics could encompass at least a twenty-year project. This concept views conversion as a continuous change to more improved methods and machines. "Electronic equipment...is not obsolete as long as it does your particular job economically. And better use of equipment by improved operating techniques may more than offset future technical advancements. This philosophy does not hold forever....[but]the real danger is not that your equipment will become obsolete, but that you will let humans interpose themselves in the information flow of your business, and thereby slow the entire system down to their particular speed."

In considering a computer, "try to avoid thinking of simply replacing manual operations with electronic; instead, think of what information you need or want, and not the form in which you have been getting it." Routine compilations need not be prepared and filed as a matter of course, since the computer's speed and power can produce whatever information you need when you need it.

THE NEW DIMENSION IN CHECK HANDLING—SPEED

BANKING, May 1959; pages 52, 53, 133, 124.

Check redesign by ABA specifications

The ABA report on mechanized check-handling discusses the problems banks must meet and overcome as well as the technical specifications of the magnetic ink character recognition (MICR). Plans for replacing "our antiquated clearing system" are beginning with pilot installations planned for five Federal Reserve Banks to be underway early in 1960. Those who do not intend to mechanize can participate profitably in the program by encoding their routing symbol and transit number. The next step toward mechanization would be adding an imprinter to code the amount on each check when it is presented for collection. The third step is to set up account numbers and transaction codes for internal check handling.

Banks are admonished to start now to redesign checks, control current inventory, and begin a public relations and education program with customers.

Check redesign may present some problems in some cases. The required height of 5/8 inches for the MICR band may make it necessary to increase the height of the entire check. This may be avoided by squeezing up the printed material already on the check, or by selecting a smaller type face. The town and state may be omitted from the date line, according to the ABA Legal Department. Also, where a title is now printed below the signature line, it is legally possible to print it above the signature to save space.

It is advisable not to print anything, such as a decorative border, in the area reserved for the MICR characters. This is particularly prohibited if the entire check is to be printed in magnetic ink. Punched card checks will need to be left clear of holes in the "8" and "9" positions in the 30 right-hand columns. The magnetic character transit and routing symbols will not replace the conventional transit and routing numbers in the fractional designation now used on all checks. This will remain in the upper right-hand portion of the check.

"Banks are not expected to move into this magnetic ink program without full consideration of all factors involved. They should however, consider not only the benefits they themselves will obtain, but also the benefits provided the whole check collection system. The industry, to some extent, is unique in that close cooperation between individual competitive units is essential to its proper functioning. Banks have an opportunity now to demonstrate this cooperation in the endeavor to mechanize the check collection system."

ALPHA-PROOF DIGIT

BANKING, May 1959; pages 49, 130.

An interview with Mr. C. R. Mussetter of Brookline Savings & Trust Company, Pittsburgh, explains the structure and use of the alpha-proof digit, that is, the use of certain letters of a customer's name as his account "number." ((See DPD, April 1959, page 12; "Account Verification with 'Alpha Digits'"))

A Post-Tronic machine has been modified with new keys containing letters instead of numbers to enter the alpha digits. Advantages of the system are the ease with which clerks learn the code, the simplicity of setting up the system, and a tendency to examine more closely the signatures on checks. The rules for the alpha digit coding are summarized.

AUTOMATION NEEDS A HUMAN POLICY

John Diebold
CHALLENGE, May 1959; pages 42-46

The article gives a "sampling of the kinds of economic problems management must face and solve if automation is to come at the most rapid pace." It is suggested that management planning for automation (in plant or office) must "give consideration to such matters as dismissal pay, training allowances and other measures to cushion the blow" to individuals whose specific jobs are eliminated through the introduction of new methods and equipment.

"Another real problem is how the benefits of automation should be divided. This is a problem the whole economy faces, but it must also be decided by the management of each individual firm.... In an automated plant, individual output ceases to have any real meaning, for the machine sets and follows its own pace.

Who gets the profits from automation?

"Should workers who happen to be working for automated industries get the whole benefit of automation? If they do, what effect will this have on workers in industries that are not automated, expecially if the industry is not one that lends itself readily to automation? If, on the other hand, such wage increases are granted more or less across the board, wages would outrun productivity increases, and the resulting inflation would harm the whole community." In addition, the consumer must be considered as benefiting from automation through lowered prices, and the company must be able to put something aside for future investment in automation equipment when the present equipment becomes obsolete. "If wages rise to the limits of the increase in productivity, everything else is shortchanged."

SURVEY OF BENEFITS RESULTING FROM THE USE OF ELECTRONIC DATA PROCESSING EQUIPMENT

Report published by Lybrand, Ross Bros. & Montgomery

A much-needed, objective survey of eleven companies with several years of experience in operating EDP systems was made for the purpose of evaluating the benefits of the systems to the companies. The survey included eight manufacturers, two transportation companies, one pharmaceutical and chemical processor. The heavy concentration on manufacturers was made to ensure the inclusion of a representative number of "control" type applications.

Computer installations included IBM 650 tape, IBM 305 RAMAC, IBM 705, Univac I and II, and three unidentified medium and large computer systems. The analysis showed that benefits have been felt in the following areas: 1) personnel displacement, 2) improved management control, 3) reduced expense due to faster billing, 4) improvement of competitive position.

Personnel savings are hard to prove

However, the savings in clerical personnel, while evident in the high volume applications, were hard to prove. Control, particularly in inventory control, appeared to be the most improved area of computer application, although this better showing may have been caused by a lack of improvement in pre-EDP control systems.

Exception reporting and more timely information seemed to be the most rewarding benefits of the EDP systems surveyed.

Some examples of specific benefits:

Some specific benefits

a) Two companies with high volume applications have saved over one million dollars each over the life of their systems.

b) A smaller company whose activities were highly decentralized is saving in excess of $250,000 annually, through centralization.

c) One company, with a history of 10-15% annual increase in paperwork, has found the computer capable of handling the growing workload with no increase in the EDP equipment or staff, plus additional time available for new applications.

d) A manufacturer of automotive parts, in a highly competitive industry, has reduced investment in inventory by 50%. A large military equipment systems supplier has reduced certain inventory costs by 75%, saving $144,000 per year.

e) One national manufacturer of producer's durable goods has reduced their production control cycle from 5-1/2 weeks to 48 hours.

Information about this 66-page survey may be obtained from local offices of Lybrand, Ross Bros. & Montgomery, or from their Management Services Research and Consulting Division, 2 Broadway, New York 4, New York.

WHEN NOT TO USE A LARGE COMPUTER

Dr. Ernest E. Blanche, consultant
JOURNAL OF MACHINE ACCOUNTING, May 1959; pages 15-17, 20-25.

Some characteristics of computer problems or applications which have the most weight in determining whether a large computer should be used are:

1. Number of arithmetic operations and decisions.
2. The volume of information or data to be processed.
3. The frequency of repetition of data-processing or computation.
4. Validity or reliability of input data.
5. Deadline for reporting.
6. Cost of performing the work.

The six characteristics must be considered together. While there may be a large amount of work to be processed, if the answer is not needed in a hurry, a smaller computer can do the job. Or perhaps the cost of performing the work on a large computer is greater than the value of the work performed. Some examples of specific problems are given which demonstrate the selection of a computer in the light of these characteristics.

Programing

AUTOMATIC PROGRAMMING SYSTEMS

COMMUNICATIONS OF A.C.M., May 1959; page 16

The following chart is reproduced from the Communications of the A. C. M. It shows automatic programing systems which are available from the A. C. M. Library for 27 different computers, plus other systems which have been written, but which are not filed with the Association for Computing Machinery. This list, the most complete we have seen, indicates the magnitude of the automatic programing effort.

Automatic Programming Systems*

Computer	In ACM Library	Do Not Have
704	AFAC CAGE CORBIE FORTRAN KOMPILER 3 MYSTIC NYAP PACT IA REG-SYMBOLIC SAP	ADES FORC
701	BACAIC DUAL-607 FLOP JCS-13 KOMPILER 2 PACT I QUICK SEESAW SHACO SPEEDCODING 3	BAP DOUGLAS GEPURS LT-2 QUEASY SO 2 SPEEDEX
705	ACOM AUTOCODER ELI PRINT I SOHIO SYMBOLIC ASSEMBLY	FAIR
702	AUTOCODER ASSEMBLY SCRIPT	
650	ADES II APT BACAIC BELL BELL L2, L3 CASE SOAP III DRUCO I EASE II ELI FAST FOR TRANSIT FORTRUNCIBLE IT IT 3 MYSTIC RELATIVE RUNCIBLE SIR SOAP I SOAP II	BALITAC ESCAPE FLAIR KISS MITILAC OMNICODE SPEEDCODING SPUR
650 RAMAC	GAT-2	
NORC	NORC COMPILER	
7070	BASIC AUTOCODER	

Computer	In ACM Library	Do Not Have
1103- 1103A	APT BOEING CHIP FAP FLIP-SPUR MISHAP MYSTIC RAWOOP-SNAP UNICODE USE	TRANS-USE
UNIVAC I, II	A0, A1, A2 ARITHMATIC (A-3) BIOR FLOWMATIC (B-0) GP GPX (II ONLY) MATHMATIC (AT-3) MATRIX MATH NYU, OMNIFAX SHORTCODE UNISAP X-1	MJS RELCODE
DATATRON 201 204 205	APX III DUMBO PURDUE COMPILER SAC SIMPLE UGLIAC	ANCP BELL DATACODE I DOW COMPILER SHELL SPAR STAR 0
G-15	DAISY 201 FLIP INTERCOM 101 INTERCOM 1000	POGO
WHIRLWIND	COMPREHENSIVE SUMMER SESSION	ALGEBRAIC
FERUT	TRANSCODE	
JOHNNIAC	EASY FOX	
ILLIAC	ILLIAC	
LGP-30	ERFPI JAZ SPEED	
MIDAC	EASIAC MAGIC	
LARC		K5 SAIL
FERRANTI MERCURY	AUTOCODING MAC (NORWAY)	
FERRANTI PEGASUS	AUTOCODE	

* See *ACM Communications 1* (Apr. 1958), 7.

COMPUTER PROGRAM ABSTRACTS

CHEMICAL ENGINEERING PROGRESS, May 1959; pages 94, 96.

A new feature in this publication is the section on computer program abstracts, submitted by companies to the Machine Computation Committee of A. I. Ch. E. These abstracts are to be the result of actual industrial programs. The Committee plans to publish complete program manuals for large, general purpose programs for the chemical industry. Questions about the feature may be directed to the Machine Computation Committee, care of A. I. Ch. E., 25 W. 45th St., New York 36, New York.

Equipment

MATRONICS DEMONSTRATES NEW LOW COST AIRLINES RESERVATIONS SYSTEM

OFFICE AUTOMATION NEWS BULLETIN, May 31, 1959; page 9

Matronics, Inc. has installed an inexpensive airlines reservation system at Areonaves de Mexico, in New York City. Two inquiry sets are connected to a Mastermind computer. An electric typewriter is the print-out medium. Cost of the installation was about $15,000. Similar systems are being installed for inventory control in several New York department stores.

NEW MAGNETIC TAPE HAS LONG LIFE

DATA PROCESSOR, May 1959, page 7

IBM Durexcel Magnetic Tape is claimed to have vastly improved durability and reliability. It may be reprocessed many times, a feature particularly adaptable to applications requiring repeated or frequent file processing.

COMPUTER OUTPUTS TO USE SPIT

AUTOMATIC CONTROL, June 1959; page 61, 62

Associated Consultants, Philadelphia, have developed a unit which may be attached to a high-speed printer to search, select, and print randomly located items which have been recorded on magnetic tape. The system is called SPIT--Selective Printing of Items from Tape.

Comment

SIGNIFICANT ADVANCES IN AUTOMATIC PROGRAMING

It really boils down to this: anyone seriously interested in electronic data processing must learn about AIMACO[1]. That is a strong statement, we realize, but we mean it. Here is a development that has emerged so rapidly that it is in useful operation before a large segment of the EDP field has even heard of it. To give a better picture of what AIMACO is, let us answer several major questions about it.

What is AIMACO?

English code for all AF computers

The word AIMACO stands for "Air Materiel Command." It is a name given to a new system of automatic programing which is an extension of the Remington Rand Flow-Matic system. Both AIMACO and Flow-Matic allow computer programs to be written in English language sentences, such as the following:

Compare the quantity on hand with the reorder level;

If greater, go to operation ___;

Otherwise, go to operation ___.

There is a formal arrangement for all sentences and some of the sentences have to do with manipulations of the data within the computer. In general, though, a person not familiar with computer programing can read the sentences and understand them. Managers can now see exactly what procedures are being used by the computer.

In the AIMACO and Flow-Matic systems, these English sentences, together with descriptions of the files, records and fields to be processed, are fed to the computer. The compiling system then generates and assembles the final machine program for accomplishing the processing.

What are the Major Advantages of AIMACO?

In the AIMACO system, at present, the English sentences can be compiled into an efficient program for the RemRand 1105 computer. Shortly, the system will be extended to compile the same sentences into IBM 705 programs. If desired, the system could be quickly extended to convert the same sentences into Univac II programs. And there is some evidence that before too long we may see the same sentences able to be compiled into efficient programs for the following machines: RCA 501, Burroughs 220, Honeywell 800 and perhaps others.

The advantages for AF management

For the Air Force, the advantages are obvious. Good programs, written at one AF base, can be automatically compiled for use at other bases, which use other types of equipment. And since AF management can read and understand the sentences, there is a much greater probability that the same good procedures will be used at all bases. In addition, when one machine is replaced by a newer one at an AF installation, the old programs can quickly be compiled for the new machine.

There are numerous other advantages; space does not allow going into them in much detail. As improvements are made in the AIMACO system, it is relatively easy to modify the English sentences and recompile new, more efficient programs; thus AIMACO is open-ended. The AIMACO system can be used on itself to achieve these improvements (pulling itself up by its bootstraps). AIMACO allows the systems analyst--who should be in the best position to know an operation--to write the computer program. Tests indicate that AIMACO cuts programing costs by a factor of 5 to 1. A complete payroll program was written (in Flow-Matic) and a sample payroll run for 4000 employees within 2 weeks.[2]

But there are other advantages for systems personnel when many computers can accept AIMACO. During equipment selection, sample programs can be written and submitted to the manufacturers. The programs can be compiled and perhaps run on the different machines, giving us--for the first time--good quantitative comparisons of the different machines. And two representatives of Remington Rand, in the RemRan Los Angeles office, have developed a modification of Flow-Matic (called SEE) to be used by systems personnel; use of a technique like SEE would result in cleaner, more precise systems work and would provide a much better basis for programing than present ambiguous methods.

Is AIMACO now the Ultimate?

Most definitely "No!" As new as AIMACO is, it is already in its second phase. We see numerous improvements that should be made: acceptance of variable length records, ability to accept arithmetic statements in equation form, to mention two. But, as mentioned above, AIMACO itself can be used to develop such improvements.

Resistance to the system by professional programers

There has been a reported negative reaction to Flow-Matic and AIMACO among professional programers. Possibly this reaction is due to the fact that these new systems take away from the programer some of the functions he previously performed. Even at this early stage, AIMACO and Flow-Matic compete favorably with the average programer in efficiency of machine operation; as the systems improve, they may compete even with highly skilled programers. But these new systems allow the programer to spend more of his time in systems work.

And, unfortunately, there may be some resistance to AIMACO because it was developed largely by one computer manufacturer and one military agency. We hope this resistance never really materializes.

What is the Status of AIMACO today?

The Air Materiel Command, which is beginning to receive RemRand 1105's, is using AIMACO for most 1105 programs. The first 1105 programs produced by AIMACO should be running by the time this article is published. Also, work is progressing to extend the system to the IBM 705.

A common programing language is now possible

At least one major U. S. industrial firm is working with the Air Force in the development of AIMACO. This firm has already decided to do all future programing in AIMACO, and has notified all computer manufacturers that if they want to sell computers to this firm, they must have compilers which will accept the AIMACO language. So far, this firm reports, all manufacturers have agreed to this stipulation.

But perhaps AIMACO's most significant contribution has been that it has proved that a common programing language is feasible, practical, and timely. All major computer manufacturers are in the process of developing their own compiling systems. The Department of Defense is to be commended for taking the initiative in calling all computer manufacturers together (on May 28 and 29, 1959) to join in a cooperative effort in developing a common problem-oriented machine-independent language for the application of EDP equipment to business-type problems. The common language may or may not be AIMACO; most likely, the present AIMACO language will be a part of the common language, so that AIMACO programs would be acceptable.

Yes, we sincerely believe that AIMACO is a significant step in our already-dynamic field. Anyone seriously interested in EDP must learn about AIMACO.

References:

1. "The Air Force Breaks Through Communications Barrier," DPD, July, 1959, page 1.

2. "Automatic Programming for Business Applications," DPD, April, 1959, page 4.

3. "Signal Corps Research and Development on Automatic Programming of Digital Computers," DPD, July, 1959, page 2.

References

The publishers of books and periodicals mentioned in this issue of DATA PROCESSING DIGEST are listed below for your convenience in writing to them for more complete information.

Association for Computing Machinery
2 East 63rd Street
New York 21, New York

Automatic Control
430 Park Avenue
New York 22, New York

Banking
12 East 36th Street
New York 16, New York

Chemical Engineering Progress
25 West 45th Street
New York 36, New York

Challenge
New York University, Institute of
Economic Affairs
475 Fifth Avenue
New York 17, New York

Computing News
12805 - 64th Avenue South
Seattle 88, Washington

Data Processor
IBM Corporation
590 Madison Avenue
New York 22, New York

Journal of Machine Accounting
208 South Main Street
Paris, Illinois

Management & Business Automation
600 West Jackson Boulevard
Chicago 6, Illinois

Modern Railroads
201 North Wells Street
Chicago 6, Illinois

N. A. A. Bulletin
505 Park Avenue
New York 22, New York

Office Automation News
155 Fifth Avenue
New York 10, New York

United States Investor
286 Congress Street
Boston 10, Mass.

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Training

"Frontier Research in Digital Computers," two-week summer conference

Date: August 17-28, 1959
Place: University of North Carolina, Chapel Hill, N. C.
Courses: Introductory course, "Modern Uses of Digital Computers," for beginners in the field
Advanced courses: "Advanced Numerical Analysis"
"Automatic Programming and Artificial Intelligence"
Fees: Introductory course, $150; Advanced courses, $200
Visiting lecturers include professors from France, Germany, Russia, Switzerland and the United States
Information: The Director, Research Computation Center, University of North Carolina, Chapel Hill, N. C.

AMA Systems Courses

Unit I: September 14-18, 1959
Sheraton Palace Hotel, San Francisco
Unit II: October 26-30, 1959
Ambassador Hotel, Los Angeles
Unit III: November 30 - December 4, 1959
Ambassador Hotel, Los Angeles
Information: Andrews M. Lang, American Management Association Academy, Saranac Lake, New York

Meetings

Northwest Computing Conference, sponsored by Northwest Computing Association and Computing Laboratory of University of Washington

Date: August 7, 8, 1959
Place: Seattle, Washington (University campus)
Theme: "Expanding Frontiers in Electronic Computing"
Information: Hilton U. Brown, III, President of Northwest Computing Association, P. O. Box 836, Seahurst, Washington

A. C. M. Conference

Date: September 1-3, 1959
Place: Cambridge, Mass. (Massachusetts Institute of Technology)
Information: F. M. Verzuh, Computation Center, Massachusetts Institute of Technology, Cambridge, Mass.

Bendix G-15 Users Exchange Organization

Date: September 16-18, 1959
Place: Palo Alto, California

ISA Conference: "World Progress in Instrumentation"

Date: September 21-25, 1959
Place: Chicago, Illinois
Information: Instrument Society of America, 313 Sixth Avenue
Pittsburgh 22, Pennsylvania

1959 International Systems Meeting, Systems and Procedures Association of America

Date: October 12-14, 1959
Place: Toronto, Ontario (Royal York Hotel)
Information: Systems and Procedures Association, 4463 Penobscot Building,
Detroit 26, Michigan

Operations Research Society of America National Meeting

Date: November 11-13, 1959
Place: Pasadena, California (Huntington Sheraton Hotel)
Information: ORSA, Mt. Royal and Guilford Aves., Baltimore 2, Maryland

Eastern Joint Computer Conference

Date: December 1-3, 1959
Place: Boston, Mass. (Statler Hilton Hotel)
Papers: Abstracts of papers to be submitted for acceptance should be
sent before August 15 to J. H. Felker, Bell Telephone Labs,
Mountain Avenue, Murray Hill, New Jersey